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Desmodium gyrans. The effects of various drugs are also very similar. The first result of the application of an anaesthetic like ether is to evoke a transient exaltation, followed by depression and arrest. Poisonous gases also induce a continuous depression of activity. A strong poisonous solution, again, induces a rapid arrest of pulsation.

It has thus been shown that by the waxing and waning of response, the variations in the plant's physiological activity, under changing external conditions, may be gauged. It has been shown also how numerous and varied are the factors that go to make up the complexity of plant-responses. It has been shown that stimulus may be modified in its effect, according as it is direct or indirect, and feeble, moderate, or strong. The modifying influence of the tonic condition of the tissue has also been shown, according as this is normal, sub-tonic, or fatigued. In the numberless permutations and combinations of these varied factors lies the infinite complexity of the responsive phenomena of life.

After a discussion of Professor Bose's paper by Doctors Rusby, Richards, and Pond, the meeting of the Club was adjourned to the second Tuesday in January.

MARSHALL A. HOWE,
Secretary pro tem.

OF INTEREST TO TEACHERS

FOOD FOR THOUGHT

School Science and Mathematics for January gives the following "simple plant experiment" by E. S. Gould, of Galva, Illinois.

"The following device for showing the necessity of CO_2 in photosynthesis may be of use to teachers of botany, especially where apparatus is limited.

"A bell glass with a rubber stopper is placed on an ordinary pump plate. The tube *C* of the plate is closed with a cork. In the cylinder inside is placed NaOH or Ca(OH)_2 to absorb the CO_2 . Air is forced through tube *A* (tube *B* being open) for a few minutes until the most of the air in the bell glass is devoid of CO_2 . What CO_2 is left in the glass will be absorbed by the NaOH in the cylinder. The air is changed every day so that if

there were anything in air beside CO_2 that helped in photosynthesis the plant would be sure to have it. Tube *B* is kept closed except when it seems necessary to introduce water through it to the plant. Before commencing the experiment the leaves of the plant were found to contain starch, but after continuing it three days all traces of starch disappeared, thus proving that CO_2 is necessary in photosynthesis.

"The department editor * wishes to raise four questions relative to this experiment :

1. Do the pupils know enough chemistry to enable them to prove that NaOH or $\text{Ca}(\text{OH})_2$ takes CO_2 from the air?
2. Is it true that forcing the air through the liquid in the cylinder by means of tube *A*, and out of the bell jar through tube *B* "for a few minutes" would render "most of the air in the bell jar" devoid of CO_2 ?
3. How does the pupil know that in watering the plant through tube *B* you do not introduce CO_2 sufficient for the plant's uses?
4. Does this prove "that CO_2 is necessary in photosynthesis"?

"Do not all the points raised in these questions refer to things that the student must take for granted upon the authority of the teacher? If so, would it be quite as well for the pupil to assume in the beginning that the teacher is correct when he says that CO_2 is necessary to the process of photosynthesis?"

The Outlook of December 19 has a short, practical article on forest fires and their prevention, written by Alfred L. Donaldson.

The increasing interest taken in our national forests is indicated by Speaker Cannon's statement that three years ago they cost three hundred and seventy-five thousand dollars, this year, nearly four million, and the estimates for next year are about six million dollars.

The North American Review for November, 1908, contains an article by Gifford Pinchot on "The Foundations of Prosperity" which is well worth reading. Mr. Pinchot remarks that the

* Professor O. W. Caldwell, School of Education, University of Chicago. It is with his permission that this article is reprinted from *School Science and Mathematics*.
— EDITOR'S NOTE.

"Forest Service is the sole present example of a branch of our National Government which finds the reason for its existence in the need of a long look ahead"; and he rightly emphasizes the present discussion of the conservation of natural resources as "the most fundamental question now before the country." For "if we succeed in the conservation of our natural resources, we shall have an opportunity to succeed in everything else."

Science has recently printed another article on the coconut bacterial disease known as bud-rot, which is becoming very common in tropical America. "It is confined to the crown, or terminal bud, of the tree, in which it causes a soft, vile-smelling rot. Owing to the great height of the coconut trees and the difficulty experienced in getting at the terminal bud, surrounded as it is by the sheathing cases of the petioles of the leaves, it is almost impossible to treat the disease locally." The results of the investigations carried on by the United States Department of Agriculture and by appropriations in Cuba are expected to prove helpful. At present the disease seems to be increasing rapidly and none but very early cases are checked by treatment.

Professor Edward L. Nichols, retiring president of the American Association for the Advancement of Science, in his Baltimore address on "Science and the Practical Problems of the Future", said, "Forests may be renewed and the soil restored to its maximum fertility but the problem which is presently to confront the race is that of civilized existence without recourse to energy stored by the slow processes of nature. This problem must be definitely solved before the complete exhaustion of our inherited capital. The problem is not without conceivable solution, since the annual accession of energy from the sun, did we know how to utilize it without awaiting the slow processes of storage employed by nature, is ample for every thinkable need of the future inhabitants of our planet. Estimates of the constant of solar radiation show that about 2.18 kilowatts of power is continually received from the sun for every square meter of the earth's surface or over seven and a half millions of horse-power per square mile. The

present use of power in the United States is about eighty million horse-power or one horse-power per capita. This quantity is likely to increase more rapidly than the population in the future unless curtailed by lack of fuel, but it is evident that a very small fraction of the sun's radiation would meet all demands."

NEWS ITEMS

Mr. E. H. Eaton has been made professor of biology at Hobart College.

Mr. A. J. Grout has been transferred to the Curtis High School, New Brighton, Staten Island.

Dr. J. K. Small has recently been sent to Florida by the New York Botanical Garden for a month's collecting trip.

In December, 1908, New York State, at a cost of about \$600,000, added 15,000 acres to its forest reservations in the Adirondack and Catskill regions.

Mr. Raphael Zon is studying forest management in Europe, preparatory to taking charge of the experimental work of the United States Forest Service.

The Sullivant Moss Society met at Baltimore with the American Association for the Advancement of Science. Several interesting papers were presented.

Mr. C. A. McLendon, of the South Carolina Experiment Station, has accepted the position of botanist and plant pathologist at the Georgia Experiment Station.

On January 11 the United States Senate passed a bill appropriating \$90,000 for acquiring all private holdings in the Sequoia and General Grant national parks, California.

Collections are now being made for the New York Botanical Garden along the northern coast of Cuba by Dr. J. A. Shafer, who expects to spend three months in that region.

The State Agricultural College at New Brunswick, New Jersey, offers several short winter courses in general agriculture, fruit farming, market gardening, etc. Tuition is free to residents of the state.